PATENT ABSTRACTS OF JAPAN

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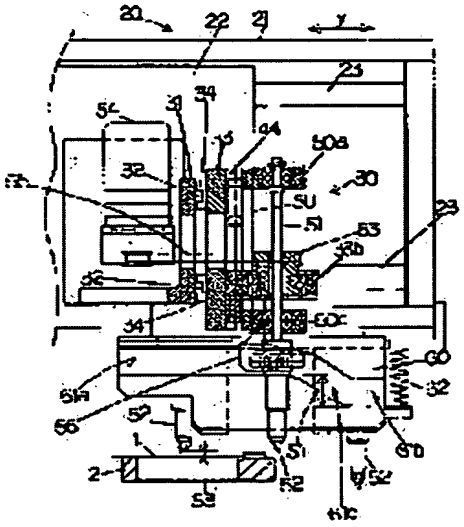
(54) DIE BONDER AND DIE-BONDING METHOD

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a die bonder and a die-bonding method, which can shorten the stroke of a nozzle at the time of picking up the chip of a chip supply part, and shorten the tact time.
SOLUTION: The nozzle 52 of a head part 300 reciprocates between a wafer 3 and a lead frame 1 by the drive of a liner motor part 20. A cam follower, provided at the mount 50 of the nozzle 52, shifts along a cam groove 61 of a cam 60. The cam groove 61 has a ramp 61c of downward slope toward the wafer 3, and when the nozzle 52 shifts toward the wafer 3, the nozzle 52 is lowered. The nozzle 52, having shifted onto the wafer 3 moves in the vertical direction by the stroke S2 by moving up and down, being driven by a motor, and picks up a chip P. Moreover, the nozzle 52 is made to take scrub action, to firmly bond the chip P to the lead frame 1.



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EFFECT OF THE INVENTION

[Effect of the Invention] Since a nozzle is moved along with a cam curve and he is trying to make it descend according to this invention when moving a nozzle toward a chip feed zone from a substrate, when taking up the chip with which the chip feed zone was equipped, or in case a chip is carried in a substrate, the stroke of a nozzle can be shortened sharply that what is necessary is to move a cam up and down with a vertical-movement means and just to move a nozzle up and down slightly. Therefore, the time amount which pickup and loading of a chip take can be shortened, and a chip can be carried in a substrate at high speed. Moreover, by adjusting the stroke of vertical movement of a cam correctly, according to the thickness of a chip, the stroke of a nozzle can be adjusted correctly, and pickup of the chip in a chip feed zone and loading to the substrate of a chip can be ensured. Moreover, by landing a chip on a substrate and making scrub actuation perform, the bonding of the chip can be firmly carried out to a substrate.
[0033] Since he is trying for a mechanical component not to serve as a load of the migration actuation between the chip feed zone of a nozzle, and the guide section of a substrate by preparing the mechanical component of the vertical-movement means for moving a cam up and down in the standing-ways side of the head section and another object according to invention of claim 2, between a chip feed zone and substrates can be moved for a nozzle at high speed, therefore it is high-speed, and migration loading of the chip can be carried out at a substrate.

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PRIOR ART

[Description of the Prior Art] As die bonding equipment which carries the chip with which chip feed zones, such as a wafer, were equipped in substrates, such as a leadframe and a printed circuit board, vacuum adsorption is carried out, the chip of a chip feed zone is taken up with a nozzle, and what carries out migration loading is known by the substrate.

[0003] Drawing 7 is the side elevation of conventional die bonding equipment. The leadframe 1 is positioned on the guide section 2. The wafer 3 is held at the holder 4. The holder 4 is put on the movable table 7 which consists of the X table 5 and the Y table 6. The head section 8 has the nozzle 9 which carries out vacuum adsorption of the chip P of a wafer 3 at the lower limit section. The head section 8 is driven in a migration device (not shown), and carries out both-way migration of between a wafer 3 and leadframes 1.
[0004] The halt location of the head section 8 drives the movable table 7, and carries out horizontal migration of the wafer 3 in the direction of X, or the direction of Y relatively to a nozzle 9 so that it may be fixed in two locations shown with a continuous line and the chain line and a nozzle 9 can take up the predetermined chip P of a wafer 3. In this case, a wafer 3 secures the paragraph difference D from the guide section, and is arranged in the low location so that the wafer 3 and holder 4 which moved to the guide section 2 side as the chain line showed may collide neither with the guide section 2 nor a leadframe 1.
[0005] Next, actuation is explained. When vertical-movement means, such as a linear motor with which the head section 8 was equipped, drive in the condition of having moved right above a wafer 3 as the head section 8 shows with the chain line, a nozzle 9 performs vertical actuation, carries out vacuum adsorption and takes up the chip P of a wafer 3. Next, the head section 8 carries Chip P in a leadframe 1, when it moves to the upper part of a leadframe 1 and a nozzle 9 performs vertical actuation again there. Chip P is carried in the leadframe 1 one after another by repeating the above actuation, carrying out pitch delivery of the guide section 2 top for a leadframe 1 to the longitudinal direction.

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the die bonding equipment and the die bonding approach of carrying out migration loading of the chip with which chip feed zones, such as a wafer, were equipped at substrates, such as a leadframe and a printed circuit board.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the die bonding equipment and the die bonding approach of carrying out migration loading of the chip with which chip feed zones, such as a wafer, were equipped at substrates, such as a leadframe and a printed circuit board.
[0002]
[Description of the Prior Art] As die bonding equipment which carries the chip with which chip feed zones, such as a wafer, were equipped in substrates, such as a leadframe and a printed circuit board, vacuum adsorption is carried out, the chip of a chip feed zone is taken up with a nozzle, and what carries out migration loading is known by the substrate.

[0003] Drawing 7 is the side elevation of conventional die bonding equipment. The leadframe 1 is positioned on the guide section 2. The wafer 3 is held at the holder 4. The holder 4 is put on the movable table 7 which consists of the X table 5 and the Y table 6. The head section 8 has the nozzle 9 which carries out vacuum adsorption of the chip P of a wafer 3 at the lower limit section. The head section 8 is driven in a migration device (not shown), and carries out both-way migration of between a wafer 3 and leadframes 1.
[0004] The halt location of the head section 8 drives the movable table 7, and carries out horizontal migration of the wafer 3 in the direction of X, or the direction of Y relatively to a nozzle 9 so that it may be fixed in two locations shown with a continuous line and the chain line and a nozzle 9 can take up the predetermined chip P of a wafer 3. In this case, a wafer 3 secures the paragraph difference D from the guide section, and is arranged in the low location so that the wafer 3 and holder 4 which moved to the guide section 2 side as the chain line showed may collide neither with the guide section 2 nor a leadframe 1.
[0005] Next, actuation is explained. When vertical-movement means, such as a linear motor with which the head section 8 was equipped, drive in the condition of having moved right above a wafer 3 as the head section 8 shows with the chain line, a nozzle 9 performs vertical actuation, carries out vacuum adsorption and takes up the chip P of a wafer 3. Next, the head section 8 carries Chip P in a leadframe 1, when it moves to the upper part of a leadframe 1 and a nozzle 9 performs vertical actuation again there. Chip P is carried in the leadframe 1 one after another by repeating the above actuation, carrying out pitch delivery of the guide section 2 top for a leadframe 1 to the longitudinal direction.
[0006]
[Problem(s) to be Solved by the Invention] In drawing 7 , since the paragraph difference D is secured, the stroke Sa when taking up the chip P of the wafer 3 of a nozzle 9 is quite longer than the stroke Sb when carrying Chip P in a leadframe 1. Therefore, the time amount which vertical actuation for a nozzle 9 to take up the chip P of a wafer 3 takes was taken for a long time, and had the trouble that a tact time became long so much and working capacity was not increased.
[0007] Moreover, although the head section 8 is equipped with the vertical-movement means (linear motor etc.) of a nozzle 9, a vertical-movement means has quite heavy weight. Therefore, the vertical-movement means became a big load in case the head section 8 carries out both-way migration of between a wafer 3 and leadframes 1, for this reason, could not gather passing speed of the head section 8, but was set to one of the causes by which working capacity does not go up this, either.
[0008] Therefore, this invention shortens the stroke of the nozzle when taking up the chip of chip feed zones, such as a wafer, and aims at offering the die bonding equipment which can shorten a tact time. Moreover, this invention makes the load of the head section small, and aims at offering the die bonding equipment which can be made to be able to move the head section at high speed between a chip feed zone and substrates, and can gather working capacity, and the die bonding approach.
[0009]
[Means for Solving the Problem] The chip feed zone which invention of claim 1 secured the paragraph difference from

the substrate positioned by the guide section and this guide section of a substrate, and was arranged in the low location, The head section which carries out migration loading at the substrate which carried out vacuum adsorption, took up the chip with which the chip feed zone was equipped in the lower limit section of a nozzle, and was positioned by the guide section, It is die bonding equipment equipped with the migration device to which between the guide section of a substrate and chip feed zones is moved for this head section. The cam for which said migration device has the cam curve of a downhill grade toward said chip feed zone from the positioning section of said substrate, By having the cam follower which is prepared in said head section side and moves along with this cam curve, and moving said cam up and down A vertical-movement means to move said nozzle up and down in one with said cam was established, and further, said head section was equipped with the motor for carrying out scrub actuation of said nozzle while it was equipped with the attachment object which stands straight and inserts said nozzle shaft, and the motor which does theta rotation of said nozzle shaft.

[0010] It was made for invention of claim 2 not to serve as a load of the migration actuation of said mechanical component between said chip feed zone of said nozzle, and said guide section by preparing the mechanical component of said vertical-movement means for moving said cam up and down in the standing-ways side of said head section and another object.

[0011] The chip feed zone which invention of claim 3 secured the paragraph difference from the substrate positioned by the guide section and this guide section of a substrate, and was arranged in the low location, The head section which carries out migration loading at the substrate which carried out vacuum adsorption, took up the chip with which the chip feed zone was equipped in the lower limit section of a nozzle, and was positioned by the guide section, The migration device to which between the guide section of a substrate and chip feed zones is moved for this head section, The cam which has the cam curve equipped with the ramp of a downhill grade toward said chip feed zone, A vertical-movement means to move said nozzle up and down in one with this cam by moving this cam up and down, The cam follower which moves up and down with said nozzle and moves along with said cam curve with migration of said head section by said migration device, By being the die bonding approach using die bonding equipment equipped with the motor which carries out scrub actuation of said nozzle, and moving said head section to the upper part of said chip feed zone by said migration device The process to which said ramp is passed for said cam follower, and said nozzle is dropped, and by dropping said cam with said vertical-movement means The process which said nozzle is dropped, vacuum adsorption of the chip of said chip feed zone is carried out with said nozzle, and a cam is subsequently raised, and takes up a chip, and by moving said head section to the upper part of the substrate of said guide section by said migration device The process which passes said ramp for said cam follower, and raises said nozzle, and by dropping said cam with said vertical-movement means The process which drops said nozzle and lands a chip on a substrate, and the process which said nozzle is made to carry out scrub actuation, and carries out bonding of the chip to it at a substrate are included.

[0012] Since according to invention of claims 1-3 the head section descends along with a cam curve when a nozzle moves toward a chip feed zone, only that part can earn the stroke of a nozzle during this migration. Therefore, by driving a vertical-movement means, a stroke in case a cam is moved up and down and a nozzle takes up the chip of a chip feed zone is shortened sharply, and can take up a chip at high speed by short stroke. Moreover, by landing a chip on a substrate and making scrub actuation perform, the bonding of the chip can be firmly carried out to a substrate.

[0013] Moreover, according to invention of claim 2, since the load of migration of the head section is mitigated remarkably, the head section can carry a chip in a substrate, moving at high speed between a chip feed zone and substrates.

[0014]

[Embodiment of the Invention] Next, a drawing is explained for the gestalt of 1 operation of this invention with reference. The perspective view of die bonding equipment [in / in drawing 1 / the gestalt of 1 operation of this invention], the important section perspective view of die bonding equipment [in / in drawing 2 / the gestalt of 1 operation of this invention], the front view of die bonding equipment [in / in drawing 3 / the gestalt of 1 operation of this invention], the side elevation of die bonding equipment [in / in drawing 4 / the gestalt of 1 operation of this invention], the top view of die bonding equipment [in / in drawing 5 / the gestalt of 1 operation of this invention], and drawing 6 are the explanatory views of a stroke of the nozzle of the die bonding equipment in the gestalt of 1 operation of this invention.

[0015] First, the whole die bonding equipment structure is explained with reference to each drawing. In addition, the same sign is given to the same element as the conventional example shown in drawing 7 . In drawing 1 , the pole 11 is set up by the top face of a pedestal 10, and the guide section 2 of a leadframe 1 is formed on the pole 11. Pitch delivery of the leadframe 1 is carried out to the longitudinal direction (the direction of X) in the guide section 2 top, and it is positioned by the position. The movable table 7 which consists of the X table 5 and the Y table 6 is installed in the side of the guide section 2, and the wafer 3 is held at the holder 4 attached in the upper part of the movable table 7. This wafer 3, the holder 4, and the movable table 7 constitute the chip feed zone.

[0016] The stanchion 12 is set up by the back corner of a pedestal 10. The cantilever of the linear motor section 20 is carried out to the upper part of a stanchion 12. This linear motor section 20 serves as a wafer 3 and a migration device to which between leadframes 1 is moved in the head section 30 so that it may mention later. The linear motor section 20 consists of the stator 21 and the migration plate 22 which are the driving source. As shown in drawing 4 , the level guide rail 23 is formed in the front face of a stator 21 the-two upper and lower sides. Moreover, the slider 24 which fits in free [the slide to a guide rail 23] is formed in the tooth back of the migration plate 22. Therefore, if it energizes in the coil (not shown) arranged by the stator 21, the migration plate 22 will slide horizontally (the direction of Y) along with a guide rail 23 with the magnetic force. In addition, as a migration device, it may replace with the linear motor section 20, and the delivery screw device using a ball screw, a nut, and a motor may be used.
[0017] In drawing 1 , the head section 30 is formed in the front face of the migration plate 22. The head section 30 is attached to the migration plate 22, moves in the direction of Y in one with the migration plate 22 between a leadframe 1 and wafers 3, and explains the detailed structure below. In drawing 1 and drawing 2 , 31 is the bracket of a key mold and is attached in the front face of the migration plate 22. The front face of a bracket 31 is equipped with the guide rail 32 of the-two horizontal (the direction of X) upper and lower sides. Moreover, the plate 33 is formed in the front face of a bracket 31. As shown in drawing 5 , the slider 34 which fits in free [the slide to a guide rail 32] is formed in the tooth back of a plate 33. Therefore, a plate 33 is horizontally (the direction of X) movable freely along with a guide rail 32.
[0018] As shown in drawing 2 , the roller 35 is formed in the side-face lower part of a plate 33. The roller 35 is in contact with the oblong guide 36. In drawing 5 , 37 is a spring for energizing a plate 33 to a guide 36 side, in order to push a roller 35 against a guide 36. The guide 36 is combined with the point of a shaft 38 in drawing 2 and drawing 5 . The roller 39 is fixed to revolve by the back end section of a shaft 38. The roller 39 is in contact with the cam 40. In drawing 4 , the guide 43 which it shows to a shaft 38 moving to the longitudinal direction is formed on standing ways 42. If a motor 41 drives and a cam 40 rotates, a shaft 38 will reciprocate slightly to the longitudinal direction (the direction of X). Thereby, a plate 33 also reciprocates in the direction of X through a guide 36 or a roller 35. This reciprocation makes scrub actuation of the direction of X perform for the nozzle mentioned later.
[0019] The anterior part of a plate 33 is equipped with the attachment object 50 in drawing 2 . The plate 33 is equipped with the attachment object 50 free [vertical movement] through a perpendicular guide rail 44 and a perpendicular slider 43 (also see drawing 3). In drawing 2 and drawing 3 , Bearings 50a and 50c protrude on the attachment object 50, and the nozzle shaft 51 is stood straight and inserted in this. The nozzle 52 which carries out vacuum adsorption of the chip is formed in the lower limit section of the nozzle shaft 51. 53 is the timing pulley with which the nozzle shaft 51 was equipped. This timing pulley 53 is attached in bearing 33b fixed to the front face of a plate 33 free [rotation]. It is supported free [sliding only to the vertical direction] by the bearing which the spline slot is formed in the peripheral surface of the nozzle shaft 51 along with the longitudinal direction (not shown), and was built in the timing pulley. It is equipped with the motor 54 for theta rotation behind the bracket 31. Rotation of a motor 54 is transmitted to the nozzle shaft 51 through a timing belt 55 or the timing pulley 53, and theta rotation of the nozzle shaft 51 is done a core [the axial center]. This sets horizontal angle of rotation of the chip by which vacuum adsorption was carried out as the lower limit section of a nozzle 52.
[0020] In drawing 2 and drawing 4 , the side-face lower part of the attachment object 50 is equipped with the bar 56. The cam follower 57 is fixed to revolve by the lower part of a bar 56. 60 is the cam of long plate type [direction / of Y], and the cam groove 61 which constitutes a predetermined cam curve is formed in the direction of Y for a long time in the front face. In drawing 3 , 1st horizontal level 61a located right above a leadframe 1, 2nd horizontal level 61b located right above a wafer 3, and Ryobe do, and this cam groove 61 consists of ramp 61c of a downhill grade toward the wafer 3. The cam follower 57 with which the attachment object 50 was equipped has fitted into a cam groove 61. 62 is a spring which **** a cam 60. Although the migration plate 22 will move in the direction of Y along with a guide rail 23 if the linear motor section 20 drives in drawing 3 , thereby, the nozzle shaft 51 and nozzle 52 which were held at the attachment object 50 and the attachment object 50 move up and down by a cam follower's 57 moving in this direction, rolling the inside of a cam groove 61, and moving in the inside of ramp 61c.
[0021] Next, a vertical-movement means to move a cam 60 up and down with reference to drawing 4 and drawing 5 is explained. The block 70 is formed in the tooth back of a cam 60. The lever 71 of a key mold is fixed to revolve with the pin 72 by the block 70 free [rotation in the vertical direction]. Rollers 73 and 74 are fixed to revolve by the both ends of a lever 71, and one roller 73 is in contact with the inferior surface of tongue of lobe 60a of the tooth back of a cam 60. According to the spring force of the above-mentioned spring 62 (drawing 3), a roller 73 contacts lobe 60a by pressing.
[0022] Standing ways 42 are formed behind the cam 60. These standing ways 42 are being fixed to the lower part of a stator 21. The inferior surface of tongue of standing ways 42 is equipped with the block 70, the motor 75, etc. A motor 75 rotates the long feed screw 76 in the direction of X. 77 is the bearing of the point of a feed screw 76. The feed screw 76 is equipped with the nut 78. The rod 79 which extends to the front is combined with the nut 78, and the point of a

rod 79 is contacted by pressing on the roller 74 of a lever 71. 80 is the guide rail of a nut 78.
[0023] Therefore, if a motor 75 drives and a feed screw 76 rotates, a nut 78 will move along with a feed screw 76. Thereby, a rod 79 moves in the direction of X, and presses the roller 74 of a lever 71 from a tooth back. Then, a lever 71 is rotated centering on a pin 72, and the cam 60 grounded on a roller 73 through lobe 60a moves up and down. When the attachment object 50 is connected with the cam 60 through the bar 56 and the roller 57, therefore a cam 60 moves up and down, the nozzle shaft 51 and nozzle 52 which were held at the attachment object 50 and this also move up and down.
[0024] As mentioned above, when a cam follower 57 moves to the 1st along with ramp 61c of a cam groove 61, a nozzle 52 performs vertical actuation, and when a cam 60 moves up and down by the drive of a motor 75, it performs vertical actuation to the 2nd. Here, the magnitude of a stroke of the nozzle 52 by the cam groove 61 is always correctly securable by fully raising the process tolerance of a cam groove 61. Moreover, by carrying out digital control of the motor 75, the stroke of the nozzle 52 by the drive of a motor 75 is correctly controllable.
[0025] Drawing 6 is the explanatory view of a stroke of a nozzle 52. The paragraph difference D is secured in the top face (pickup level of Chip P) of the chip P with which the guide section 2 on which the leadframe 1 was put, and a wafer 3 were equipped, and the wafer 3 is arranged in the location lower than a leadframe 1 so that it may illustrate. It is as having explained the need for this paragraph difference D with reference to drawing 7 .
[0026] In order to absorb this paragraph difference D, stroke S1 is earned by ramp 61c of a cam groove 61. Moreover, also in case stroke S2 is earned and Chip P is carried in a leadframe 1 by driving a motor 75 and moving a cam 60 up and down, in case the chip P of a wafer 3 is taken up, stroke S3 is earned by driving a motor 75 and moving a cam 60 up and down. Since stroke S1 is earned while a nozzle 52 moves between a wafer 3 and leadframes 1, the time amount for earning this stroke S1 becomes unnecessary substantially, and only the time amount for earning strokes S2 and S3 is needed here. That is, since this stroke S2 is far shorter than the stroke Sa of the conventional example which a required stroke is S2 and is shown in drawing 7 in case the chip P of a wafer 3 is taken up, the time amount which pickup takes can be shortened sharply. And as mentioned above, each strokes S1, S2, and S3 are correctly realizable. In addition, since the stroke of a nozzle 52 changes with thickness of Chip P, the rotation of a motor 75 is adjusted according to the thickness of Chip P.
[0027] Moreover, although a nozzle 52 repeats between a wafer 3 and leadframes 1, both-way migration is performed and the chip P of a wafer 3 is carried in a leadframe 1, the head section 30 is another object, all the vertical-movement means (a cam 60, a lever 71, a motor 75, a feed screw 76, nut 78, etc.) for making vertical actuation perform for a nozzle 52 are being fixed to the standing-ways 42 side, and the load of both-way migration of a nozzle 52 does not become. That is, only the components attached to the bracket 31 or the attachment object 50 serve as a load of both-way migration of the nozzle 52 by the drive of the linear motor section 20. Therefore, the load of the linear motor section 20 can be small, and can move between a wafer 3 and leadframes 1 for a nozzle 52 at high speed.
[0028] This die bonding equipment is constituted as mentioned above, and explains the whole actuation below. In drawing 1 , the leadframe 1 which has had the guide section 2 top conveyed is stopped and positioned in a predetermined location. Next, when the linear motor section 20 drives and the migration plate 22 slides the front face of a stator 21 along with a guide rail 23, the head section 30 moves to the upper part of a wafer 3. At this time, when a cam follower 57 passes ramp 61c of a cam groove 61 in drawing 3 , a nozzle 52 descends by stroke S1 and reaches above a wafer 3. Drawing 4 shows the condition at this time.
[0029] Then, when a motor 75 carries out forward rotation in drawing 4 , a nut 78 retreats to the method of the right along with a feed screw 76, and a rod 79 also retreats. Thereby, a lever 71 is rotated to a counterclockwise rotation according to the load received from lobe 60a of a cam 60, and a cam 60 descends. This amount of descent is stroke S2, and thereby, the lower limit section of a nozzle 52 arrives at the top face of the chip P of a wafer 3, and carries out vacuum adsorption of the chip P. Next, if a motor 75 carries out inverse rotation, a nut 78 will move forward to a left along with a feed screw 76, a rod 79 will also move forward, and push and a lever 71 will rotate the roller 74 of a lever 71 to a clockwise rotation by the point. Thereby, only the above-mentioned stroke S2 is pushed up, a nozzle 52 also goes up by stroke S2, and a cam 60 takes up Chip P for it.
[0030] Next, the linear motor section 20 drives to hard flow, and moves the migration plate 22 to a left in drawing 4 . Although a nozzle 52 moves to the upper part of a leadframe 1 by this, when a cam follower 57 moves to the middle along with ramp 61c of a cam groove 61, a nozzle 52 goes up by stroke S1. Next, the chip P by which the cam 60 was dropped, the nozzle 52 was dropped by this, and vacuum adsorption was carried out at the lower limit section of a nozzle 52 is landed on a leadframe 1 by driving a motor 75 in the forward direction like the case of pickup of Chip P (see the chip P shown with the chain line in drawing 6). The stroke of the nozzle 52 at this time is S3.
[0031] In the state of this landing, the forward reverse drive of the motor 41 is carried out in drawing 4 and drawing 5 . Then, by rotation of a cam 40, it reciprocates to the longitudinal direction (the direction of X), a plate 33 and the attachment object 50 also reciprocate in this direction by this, and, as for a shaft 38, a nozzle 52 performs scrub actuation slightly in the direction of X. Moreover, by carrying out the forward reverse drive of the linear motor section

20 slightly, a nozzle 52 performs scrub actuation to this and coincidence slightly in the direction of Y. Thus, by carrying out scrub actuation of the nozzle 52 in the direction of X, or the direction of Y, the adhesives applied to the leadframe 1 are contacted at the whole rear face of Chip P, and the bonding of the chip P can be firmly carried out to a leadframe 1. Next, if a motor 75 is driven to hard flow and a nozzle 52 is raised after canceling the vacuum adsorbed state of Chip P, a series of actuation will be ended. Chip P is carried in a leadframe 1 one after another by repeating the actuation which mentioned the leadframe 1 above while carrying out pitch delivery of the guide section 2 top.
[0032]
[Effect of the Invention] Since a nozzle is moved along with a cam curve and he is trying to make it descend according to this invention when moving a nozzle toward a chip feed zone from a substrate, when taking up the chip with which the chip feed zone was equipped, or in case a chip is carried in a substrate, the stroke of a nozzle can be shortened sharply that what is necessary is to move a cam up and down with a vertical-movement means and just to move a nozzle up and down slightly. Therefore, the time amount which pickup and loading of a chip take can be shortened, and a chip can be carried in a substrate at high speed. Moreover, by adjusting the stroke of vertical movement of a cam correctly, according to the thickness of a chip, the stroke of a nozzle can be adjusted correctly, and pickup of the chip in a chip feed zone and loading to the substrate of a chip can be ensured. Moreover, by landing a chip on a substrate and making scrub actuation perform, the bonding of the chip can be firmly carried out to a substrate.
[0033] Since he is trying for a mechanical component not to serve as a load of the migration actuation between the chip feed zone of a nozzle, and the guide section of a substrate by preparing the mechanical component of the vertical-movement means for moving a cam up and down in the standing-ways side of the head section and another object according to invention of claim 2, between a chip feed zone and substrates can be moved for a nozzle at high speed, therefore it is high-speed, and migration loading of the chip can be carried out at a substrate.

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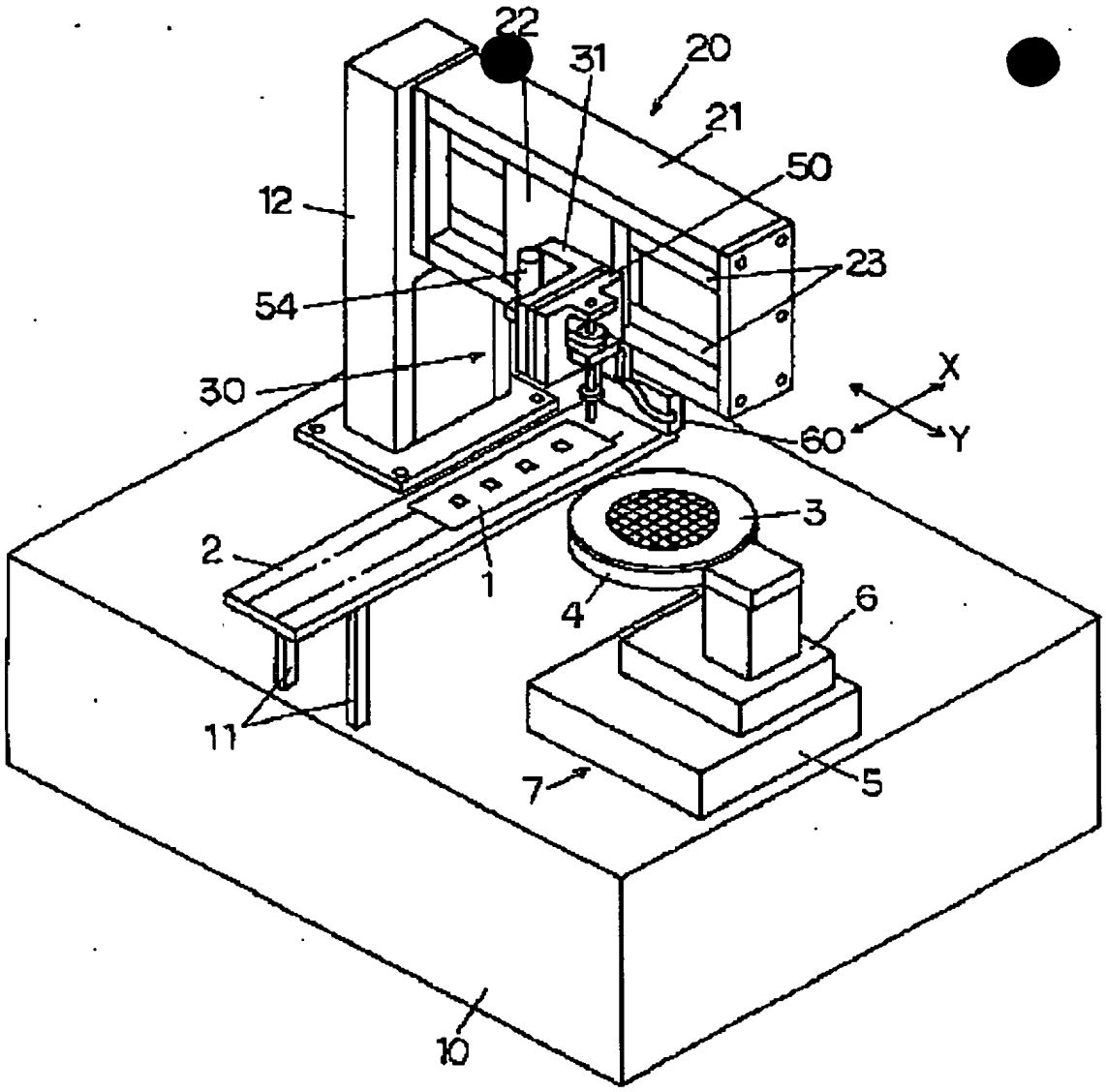
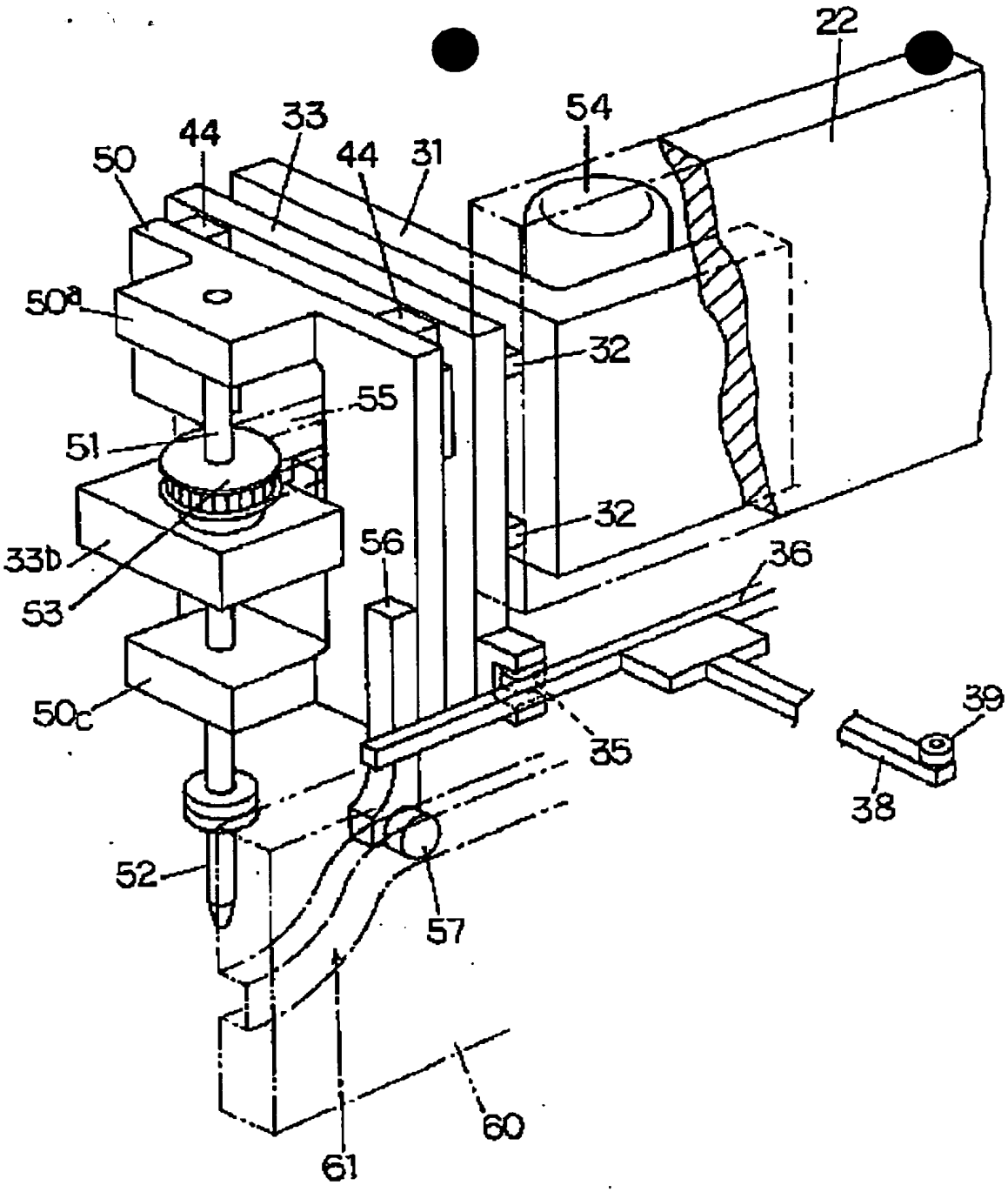
CLAIMS

[Claim(s)]
[Claim 1] The cam for which it is die bonding equipment characterized by providing the following, and said migration device has the cam curve of a downhill grade toward said chip feed zone from the positioning section of said substrate, By having the cam follower which is prepared in said head section side and moves along with this cam curve, and moving said cam up and down A vertical-movement means to move said nozzle up and down in one with said cam is established. Further said head section Die bonding equipment characterized by having a motor for carrying out scrub actuation of said nozzle while having the attachment object which stands straight and inserts said nozzle shaft, and the motor which does theta rotation of said nozzle shaft The guide section of a substrate The chip feed zone which secured the paragraph difference from the substrate positioned by this guide section, and was arranged in the low location The head section which carries out migration loading at the substrate which carried out vacuum adsorption, took up the chip with which the chip feed zone was equipped for the nozzle of the lower limit section of a nozzle shaft, and was positioned by the guide section The migration device to which between the guide section of a substrate and chip feed zones is moved for this head section
[Claim 2] Die bonding equipment according to claim 1 characterized by making it said mechanical component not serve as a load of the migration actuation between said chip feed zone of said nozzle, and said guide section by preparing the mechanical component of said vertical-movement means for moving said cam up and down in the standing-ways side of said head section and another object.
[Claim 3] The guide section of a substrate The chip feed zone which secured the paragraph difference from the substrate positioned by this guide section, and was arranged in the low location The head section which carries out migration loading at the substrate which carried out vacuum adsorption, took up the chip with which the chip feed zone was equipped in the lower limit section of a nozzle, and was positioned by the guide section The migration device to which between the guide section of a substrate and chip feed zones is moved for this head section The cam follower which moves up and down with the cam which has the cam curve equipped with the ramp of a downhill grade toward said chip feed zone, a vertical-movement means to move said nozzle up and down in one with this cam by moving this cam up and down, and said nozzle, and moves along with said cam curve with migration of said head section by said migration device, and the motor which carries out scrub actuation of said nozzle By being the die bonding approach equipped with the above, and moving said head section to the upper part of said chip feed zone by said migration device The process to which said ramp is passed for said cam follower, and said nozzle is dropped, and by dropping said cam with said vertical-movement means The process which said nozzle is dropped, vacuum adsorption of the chip of said chip feed zone is carried out with said nozzle, and a cam is subsequently raised, and takes up a chip, and by moving said head section to the upper part of the substrate of said guide section by said migration device The process which passes said ramp for said cam follower, and raises said nozzle, and by dropping said cam with said vertical-movement means It is characterized by including the process which drops said nozzle and lands a chip on a substrate, and the process which said nozzle is made to carry out scrub actuation, and carries out bonding of the chip to it at a substrate.

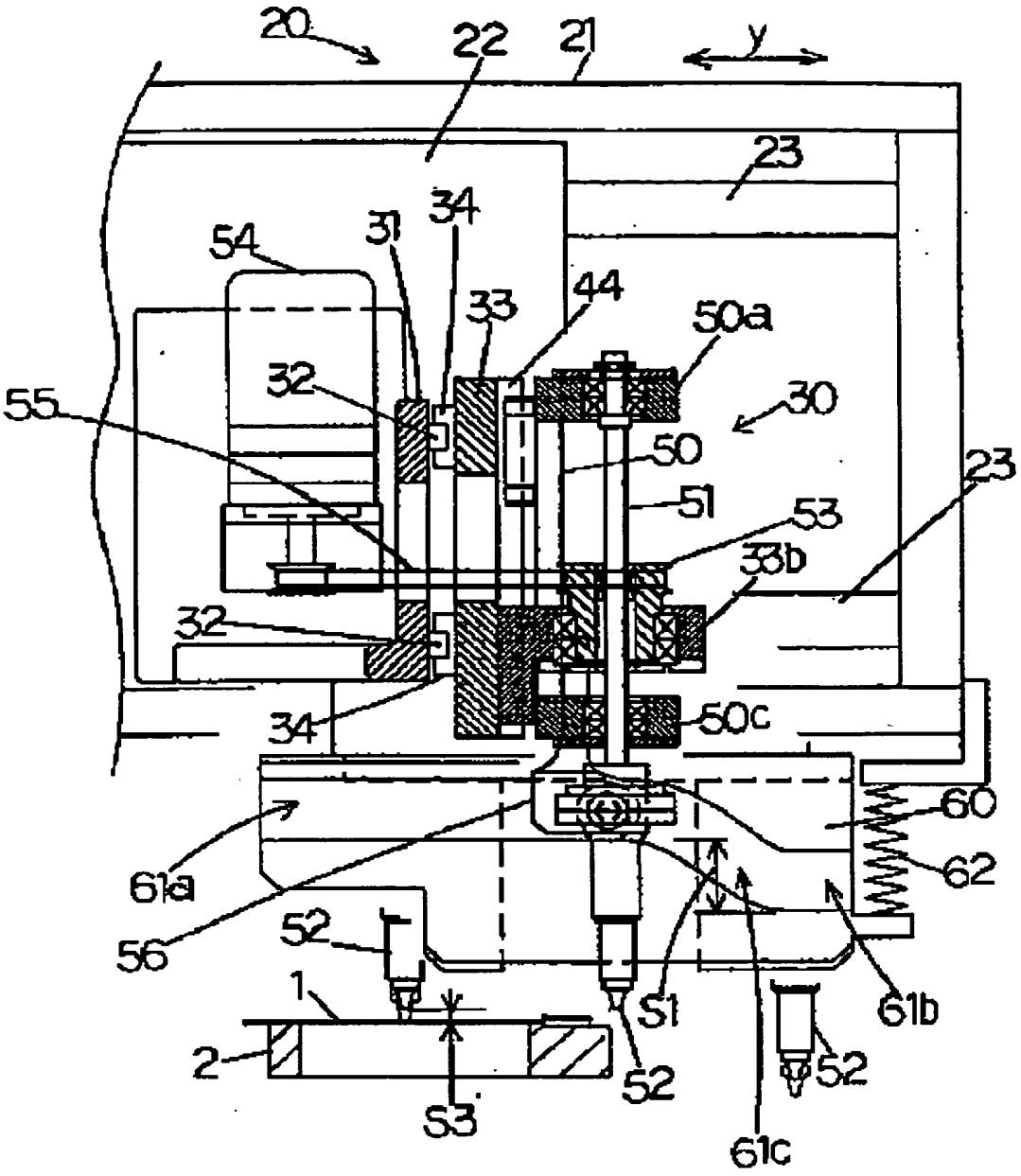
[Translation done.]



1	リードフレーム	21	ステータ
2	ガイド部	22	移動板
3	ウエハ	30	ヘッド部
20	リニヤモータ部	60	カム



52　ノズル
57　カムフオロア
61　カム溝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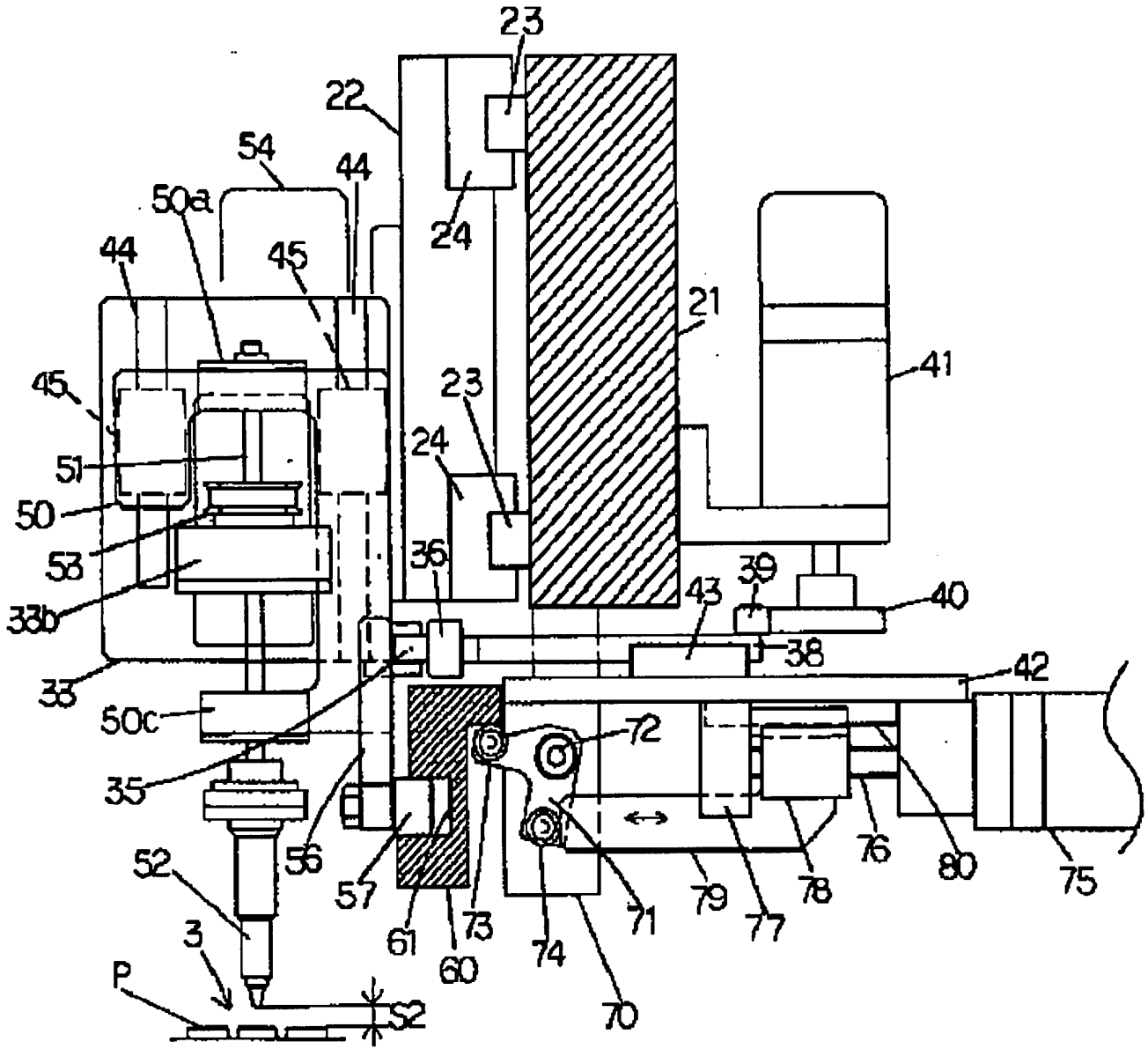
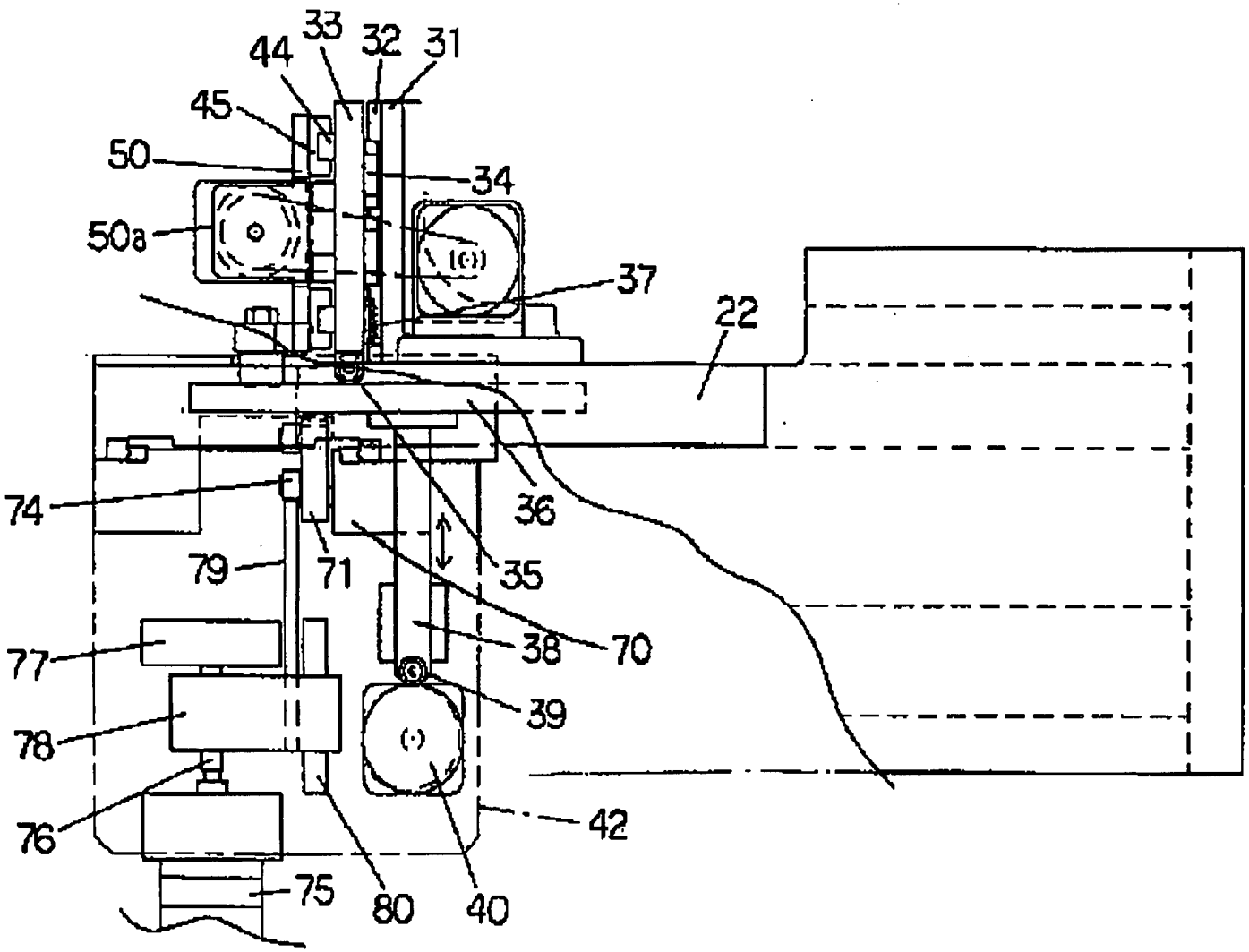


75 モータ
76 送りねじ
78 ナット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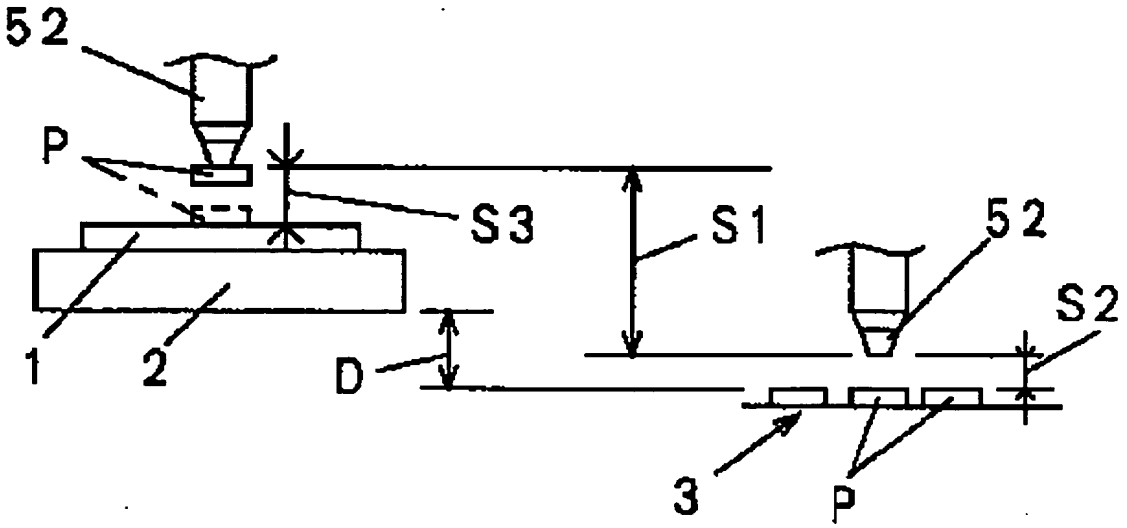
４２　固定台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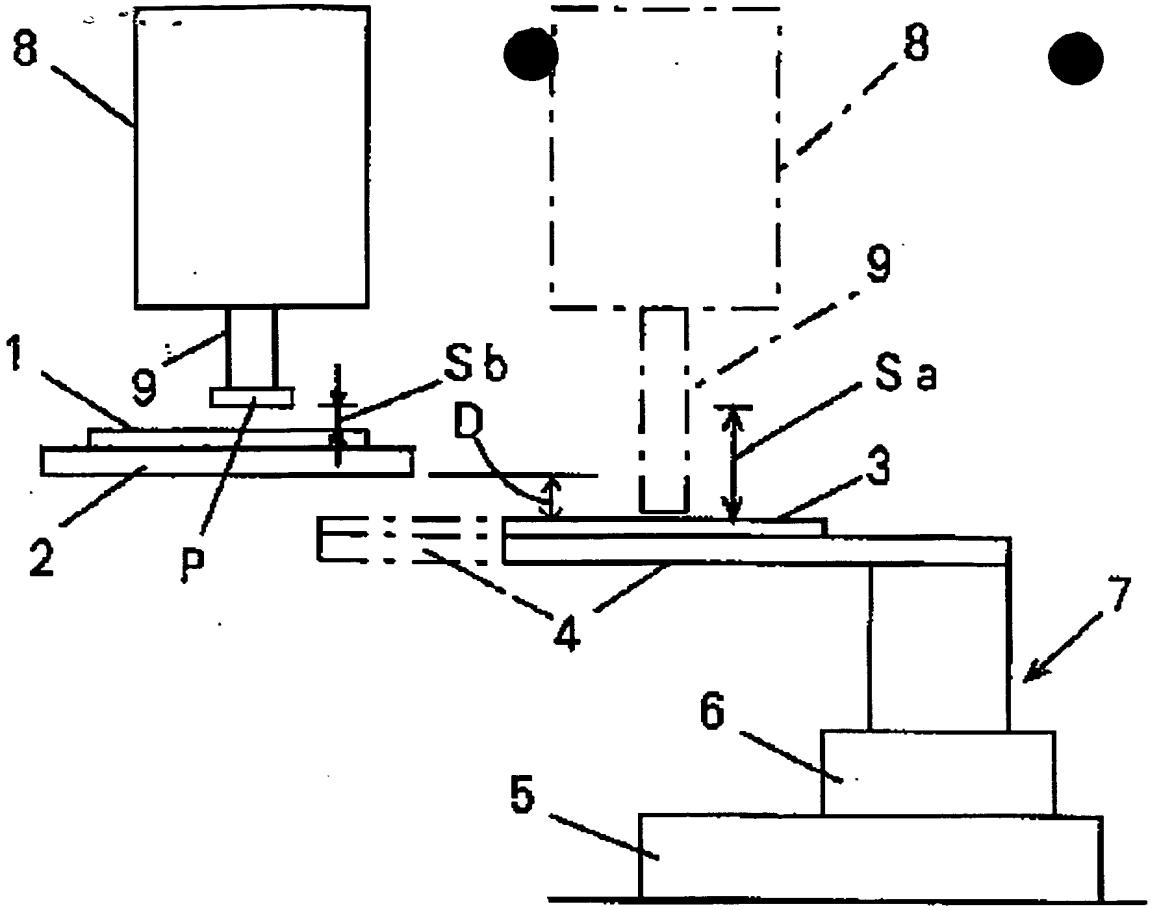
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